

Name: Solution Key

Simplify each expression (do not leave any negative exponents):

1. $\sqrt{36} = 6$

2. $\sqrt{49} = 7$

3. $\sqrt[3]{8} = 2$

4. $\sqrt[3]{125} = 5$

5. $\sqrt[4]{81} = 3$

6. $\sqrt[4]{10,000} = 10$

7. $16^{\frac{3}{2}} = (16^{\frac{1}{2}})^3$
 $= 4^3$
 $= 64$

8. $27^{\frac{2}{3}} = (27^{\frac{1}{3}})^2$
 $= 3^2$
 $= 9$

9. $8^{\frac{4}{3}} = (8^{\frac{1}{3}})^4$
 $= 2^4$
 $= 16$

10. $9^{\frac{5}{2}} = (9^{\frac{1}{2}})^5$
 $= 3^5$
 $= 243$

11. $16^{\frac{3}{4}} = (16^{\frac{1}{4}})^3$
 $= 2^3$
 $= 8$

12. $625^{\frac{3}{4}} = (625^{\frac{1}{4}})^3$
 $= 5^3$
 $= 125$

13. $\frac{7^{10}}{7^8} = 7^2 = 49$

14. $3^2 \cdot 3^3 = 3^5 = 243$

15. $\frac{6^{11}}{6^9} = 6^2 = 36$

16. $\frac{y^{17}}{y^{11}} = y^6$

17. $\frac{m^{10}}{m^{14}} = \frac{1}{m^4}$

18. $\frac{xy^9}{x^5y^8} = \frac{y}{x^4}$

$$19. \frac{48x^{13}}{12x^{10}} = 4x^3$$

$$20. \frac{6xy^{10}}{24x^6y^3} = \frac{y^7}{4x^5}$$

$$21. \frac{39x^3y^2}{13x^7y^8} = \frac{3}{x^4y^6}$$

$$22. y^{\frac{1}{4}} \cdot y^{\frac{3}{4}} = y$$

$$23. \frac{x^2}{x^{-1}} = x^2 \cdot x = x^3$$

$$24. \frac{x^{-5}}{x^{-4}} = \frac{1}{x^{-4}x^5} = \frac{1}{x}$$

$$25. (3x^3y^4)^2 = 9x^6y^8$$

$$26. 5x^4 + 6x^4 = 11x^4$$

$$27. 3x^3y + 9x^3y = 12x^3y$$

$$28. (3x^2y^4)^3 + (2xy^2)^6 =$$

$$27x^6y^{12} + 64x^6y^{12}$$

$$91x^6y^{12}$$

$$29. \frac{(2x-3y)^4}{(2x-3y)^2} = (2x-3y)^2$$

$$= 4x^2 - 12xy + 9y^2$$

$$30. \left(4x^{\frac{1}{4}}\right)\left(2x^{\frac{1}{3}}\right) = 8x^{\frac{7}{12}}$$

$$31. \left(\frac{2n}{m^2}\right)^4 = \frac{16n^4}{m^8}$$

$$32. \left(\frac{5mn^2}{k^{20}}\right)^0 = 1$$

$$33. \frac{e^{5x}}{e^x} = e^{4x}$$